

REMARKS

Reconsideration of the present application is respectfully requested.

The election of claims 1-10 is affirmed. Claims 11-19 are cancelled.

Claims 1-10 stand rejected under 35 U.S.C. § 103(a) as evidenced by a combination of various prior art patents.

The rejection is traversed.

The present invention is directed to a method to cover completely the fiber structure of a carpet having both anionic and cationic dyeable yarns with a stainblocking compound and to cause the stainblocking compound to adhere strongly without "bleeding" of dye from the cationic dyeable yarn to the anionic dyeable yarn. In addition, the method of the present invention improves the appearance of fabrics which have been treated with stain resist chemicals and are subsequently exposed to ultraviolet light.

It is readily admitted that fabric, such as carpets, containing at least two yarn types, one of which is dyeable by acidic dye and the other dyeable by cationic dye, is well known in the art.

On the other hand, the Examiner has also admitted that none of the references teach the application of stainblocker to such dual dye-type substrates. The reason is that applying stainblocker chemistry to such dual dye-type fabrics using application processes known in the art causes bleeding of the cationic dyestuff such

that the color contrast with the anionic fiber is lost or reduced. Application of stainblocker by "pad processes" as are known in the art is also not effective with fabrics of two yarn types, either in achieving the required stain resistance level or in limiting color "bleed".

The process of U.S. Patent 5,549,963 (Elgarhy et al) discloses application at low pH (2.5 is preferred) and over long exposure times (twenty minutes). If yarns of cationic and anionic dye type were treated together under such conditions the cationic dyestuff would be clearly in evidence on the anionic yarn, a most undesirable result. In general, the method disclosed in the Elgarhy et al reference (ibid, column 6, lines 44 et seq.) would cause the problem of dye transfer.

While U.S. Patent 5,681,620 (Elgarhy) discloses the application of stainblockers under high and low temperatures, there is no reference to dual dye-type yarns and the special process limitations required to treat them successfully. The padding process described by Elgarhy includes the application of steam. This steam step is not used in of the process of the present invention because steam application causes the displacement of dye from one fiber to the other. Steaming also causes the substrate to be more sensitive to ultraviolet light, owing apparently to the deeper penetration of the stain resist into the fiber of stain resist chemistries which are inherently light sensitive. It is clear in all cases that Elgarhy does not contemplate the process of the present application or the critical application of stain resist chemistry to anionic and cationic dye substrates simultaneously.

The reference to padding as described by U.S. Patent 6,387,448 (Collier) and by Elgarhy includes the step of steaming for two minutes (and even much longer) in order

to fix the stainblocker. Steaming is detrimental to the process of the present invention, which requires exposure for a very short period of time at a temperature above 70 °C in order to achieve the desired results.

Although the present invention may be viewed as a modified pad application process, the padding process is not equivalent to the process of the present invention. The present invention requires high temperature for an unusually short and controlled time interval. The present invention includes complete immersion of the fabric into a bath to expose all of the yarn fibers to stainblocker at the critical temperature and time interval of 5-30 seconds and preferably only 5-10 seconds, along the length of each tuft. Critical to the present invention is the process step of immediate removal of the excess fluid and ambient cooling, which terminates the exposure of the fabric to excess stainblocker at elevated temperature. Thus, the process of the present invention specifically excludes steaming.

Using the teachings of the present invention as a guide it may be possible to modify the padding process. However, padding per se is not equivalent to the process claimed herein. The present invention is neither anticipated nor rendered obvious by a generic reference to padding as a method of stainblocker application to fabrics.

While there are many processes which are possible for use with stainblockers, including a broad range of temperature and pH conditions, application of such stainblockers to fabrics which contain both acid and basic dye yarn functionality has, as admitted by the Examiner, not been described. Treatment of such fabrics in a way that preserves the differential dye properties of the two yarn types and provides superior resistance to ultraviolet light is also clearly not taught by Collier.

None of the methods of the prior art referred to by Collier provide for complete wetting of the fabric for the prescribed (short) time and at the prescribed (70-95 °C) temperature without the application of steam, and there is no indication that such a process modification would be beneficial to stain resistance or to either dye retention or ultraviolet light resistance. Therefore it is clear that the application conditions described by Collier et al do not disclose or contemplate the limitations of time and temperature which are both critical to impart commercially effective stain resistance to fabrics constructed of acid and base dyeable nylon yarns without the transfer of dye from cationic to anionic yarns and attendant loss of product quality.

Again, with respect to "padding" as a means of applying stainblocking compounds to such fabrics, either the completeness and robustness of stainblocker coverage or the clarity of fabric color would be compromised by any of the padding processes described by either Collier or Elgehy. Ultraviolet light resistance would also be compromised by treatment under the recommended conditions. The "hot shock" process of the present invention is surprisingly effective and is in fact essential for achieving fabric properties which were previously unknown, including a stain resistant fabric made up of anionic and cationic nylon yarns, having good dye contrast between anionic and cationic dye colors and acceptable resistance to UV light.

The critical point to note is that the technology to apply stainblocker compound to dual dye-type fabric has been unknown until the present invention because stain resist compounds cause the cationic dye substrates to bleed cationic dyes onto and then be retained by anionic dyeable fibers. The process of the present invention

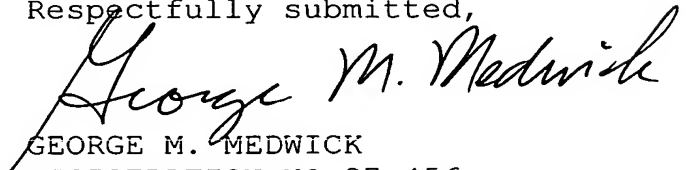
prevents the problem of cationic dye staining the acid yarns, making it possible to treat the total fabric. This ultimately prevents staining by acid dyes.

While it is true that the cationic dyeable fibers do resist acid dyes, [e.g., U.S. 5,925,149 (Pacifici)] stain resistance is somewhat further improved by certain stain resist chemistries. More importantly however, the acid dyeable components of the U.S. 4,075,378 (Anton) or the U.S. 4,043,749 (Huffman) or the U.S. 5,131,918 (Kelley) yarns are not resistant to anionic stains. Until the process of the present invention stainblockers could not be directly applied to such yarns effectively without adversely affecting the color contrast of the fabric.

U.S. 5,725,889 (Buck) teaches the use of a non-sulfonic acid resole stain resist and chemistry of making which can be applied to nylon substrates. It does not contemplate the treatment of anionic and cationic dyeable substrates in the together in the same fabric immediately after dyeing (by anionic and cationic dyes).

In view of the foregoing arguments it is believed that the claims of the present application stand in condition for allowance, which action is earnestly solicited.

Respectfully submitted,

  
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